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Launch on Warning:
The Development of U.S. Capabilities, 1959-197!

A National Security Archive Electronic Briefing Book
William Burr, Editor*

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The Bush administration is in the midst of a nuclear posture review. In h
May 1 speech, President George W. Bush announced his support for miss
defense and cuts in weapons, but his announcement did not refer to the al
posture of U.S. strategic forces. In a major campaign speech on nuclear
weapons policy that he delivered in May 2000, then-presidential candidat
Bush addressed concerns about the instant-reaction status of U.S. strategi
nuclear forces. Declaring that "the United States should remove as many
weapons as possible from high-alert, hair-trigger status," Bush argued tha
the capability for a "quick launch within minutes of warning" was an
"unnecessary vestige of cold-war confrontation."   Not only was the quicl
launch posture outdated, it was dangerous: "keeping so many weapons or
high alert may create unacceptable risks of accidental or unauthorized
launch."[1]

These remarks echoed the troubling questions that defense analysts su
as Bruce Blair (director, Center for Defense Information) have raised abo
the alert postures of the two nuclear superpowers, the United States and
Russia. Both countries, Blair has argued, have come to rely on a dangero
hair-trigger alert posture for their land based intercontinental ballistic
missiles (ICBMs). For example, Minuteman missiles are ready to launch
within seconds of a warning of attack; theoretically, if adversary missiles
are aimed at Minuteman silos, by the time they arrive, they will be strikir
empty holes in the ground. The Soviet Union also adopted the same post
during the Cold War but has not abandoned it during the post-Cold War
era.[2]

Under the circumstances of the U.S.-Soviet Cold War, a launch-

on-warning capability was a logical consequence of nuclear planning. Many Soviet targets were "time urgent" military ones that would have to destroyed quickly. By the early 1950s, soon after Moscow began produci nuclear weapons, those Soviet nuclear facilities and nuclear delivery systems that could be detected became a prime target for U.S. nuclear wa planning. Because those forces posed the great threat to the United State and its allies, U.S. military commanders and intelligence agencies looked closely for signs that the Soviet leadership might be preparing them for u in a surprise attack. By the mid-1950s, the commanders of U.S. strategic nuclear forces readily assumed that if they received "strategic warning" o an impending Soviet attack, it would be essential to stage a quick preemptive launch of SAC bombers on Soviet strategic nuclear and command and control targets. Consistent with this, the first Single Integrated Operational Plan (SIOP), approved by President Dwight Eisenhower in the fall of 1960, included preemptive and retaliatory optio for massive nuclear attacks on the most threatening Soviet targets.[3]

The development of Soviet ICBM forces, although initially slow, also raised pressure for the early launch of U.S. strategic forces. To structure them so that they could put to rapid use in a crisis and elude a surprise missile attack, in 1958, President Dwight Eisenhower approved SAC proposals creating the "Positive Control" system for the strategic bomber force.[4] Under "Positive Control," national authorities could order the launch of nuclear-armed bombers, which would orbit at designated "failsafe" locations in the Arctic circle, not far from Soviet territory until they had received orders to bomb targets or return to their bases.[5]

When the U.S. Air Force began to deploy intercontinental ballistic missiles during the late 1950s, they envisaged a strategic force that could deliver enormously destructive nuclear weapons almost immediately. Th "Minuteman" ICBM embodied the idea of a rapid reaction force. A solid fueled delivery system, it could be launched in seconds, compared to the first generation liquid-fueled systems, which had a relatively slower react time (up to 15 minutes). That missiles could be launched quickly meant that ideas of nuclear preemption remained part of the conceptual apparatu of national policymakers. Of course, there could be no "positive control" system for ICBMs: once launched, they could not be recalled.

Yet with the Soviets developing their own ICBMs and submarine-launched missiles as well, notions of preemption became less practical (leasing aside the ethical and political obstacles). One of President John Kennedy's last recorded statements about nuclear strategy occurred durin grim briefing by the National Security Council's secret Net Evaluation Subcommittee (NESC) in September 1963. Analyzing the consequences U.S. and Soviet preemptive nuclear attacks, the NESC study introduced U.S. casualty figures---30 million--that were higher than Kennedy had ev heard before. With the devastating U.S. losses from Moscow's response U.S. preemptive strike, Kennedy observed that such an option was "not

possible for us."[6]

Despite Kennedy's misgivings, a preemptive strategic option remained embedded in the SIOP through the early 1970s and undoubtedly later. For military planners at the Pentagon and elsewhere, basing U.S. strategy on idea of a retaliatory blow after absorbing a Soviet first strike was wholly unacceptable. But preemption depended on a strategic warning that was unlikely to be available. Nevertheless, by the late 1950s and early 1960s strategic planners recognized that if tactical warning information was available, there was another position that was just short of preemption but avoided "retaliation after ride-out." As White House science adviser and MIT professor Jerome Wiesner noted in mid-1959, once U.S. electronic sensors were able to detect the launch phase of a Soviet ICBM attack, the will could provide the "[warning] time necessary to ready our missiles so that they can be fired before they are destroyed."[7]

What Wiesner was pointing to was the possibility of a launch-on-warning capability. As the documents that follow indicate, such a posture was evident to U.S. government officials during the late 1950s an early 1960s. With the deployment of the Ballistic Missile Early Warning System (BMEWS), a rudimentary capability for launch-on-warning began to emerge; BMEWS gave command authorities fifteen minutes notification of a missile attack. A launch-on-warning option became more robust in early 1970s with the deployment of the satellite-based electronic warning system originally known as the Missile Defense Alert System (MIDAS) later camouflaged with the designation Defense Support Program (DSP).[8] As documents from the late 1960s and the 1970s suggest, once DSP satellites were being tested and deployed, officials and experts at the National Security Council, the State Department, and the U.S. Strategic Arms Limitation Talks [SALT] delegation, not to mention the Soviet SALT negotiators, became keenly aware of the possibility of launch-on-warning Although some looked favorably at the prospects of a launch-on-warning capability, others raised the same doubts that President Bush and others have reprised more recently, the danger of a false warning that could produce a terrible cataclysm.

The false warning problem has never been a hypothetical one. During the Cold War and after, both the United States and Russia received mistaken warnings of attack. One of the most alarming incidents took place during 1980 when National Security Adviser Zbigniew Brzezinski received a middle-of-the-night phone call reporting that warning systems indicated a Soviet all-out attack of 2,200 ICBMs. Just before he was about to call President Carter, who would have had about three to seven minutes to make a decision, Brzezinski learned that other warning systems showed that there was no attack; it was a false alarm. Someone had inserted a tape for a military exercise into a warning system computer. The warning systems were finally accurate, but the danger and possibility of error was never m

evident.[8a]

The history of the launch-on-warning capability is a complex one and declassified record is sparse, no doubt because of the issue's great sensitivity. Precisely when launch-on-warning became a specific option i U.S. nuclear planning remains classified. The documents that follow she light on the purposes that led to the launch-on-warning option as well as doubts about its propriety that were raised from the beginning. They include the first declassified discussions of the possibility of launch-on-warning as well the first confirmation that a specialized launch-on-warning option entered into the Single Integrated Operational Plan, th U.S. nuclear war plan, in 1979.

This collection also shows the limits of the available documentation or launch-on-warning. Most of the declassified material is from civilian agencies and records discussion by mostly civilian officials. Major milita organizations, however, played critically important roles in making launc on-warning an operational capability. Unfortunately, records from the 1960s and early 1970s of the Secretary of Defense, the Joint Chiefs of Sta and the Strategic Air Command, among others, remain largely classified despite Executive Order 12958's twenty-five year rule. More on launch-on-warning may be learned if and when military records are declassified.

How long high-alert strategic forces and a launch-on-warning posture will persist as basic elements of U.S. nuclear planning remains to be seen Significantly, President Bush is constrained under law from changing unilaterally the alert posture of U.S. strategic forces; since 1996 defense authorization legislation has prohibited executive branch decisions to de-alert the missile force. Unless the President challenges the constitutionality of Congressional edicts, any White House decisions on t U.S. nuclear posture will require efforts to build a consensus on Capitol Hill.[9]

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Note: The following documents are in PDF format.
You will need to download and install the free Adobe Acrobat Reader to view.

Document 1

Memorandum, Robert A. Fearey, U.S. Department of State Office of European Regional Affairs (RA), to Lane Timmons, Office Chief, RA, "Macmillan Letter."

Source: National Archives, Department of State Records, Record Group 59 (hereinafter R 59), Decimal Files, 1955-59, 611.61/5-1958 (also available in National Security Archive published microfiche collection, U.S. Nuclear History: Nuclear Weapons and Politics in th Missile Era, 1955-68, Washington, D.C., 1998)

This brief memo unambiguously conveys the notion that in the missile ag

even civilian officials would take it for granted that launch on warning of attack would be possible and necessary. In late April 1958, Prime Minist Harold Macmillan proposed that President Eisenhower agree to Anglo-American talks for a "fully agreed and understood procedure" for making decisions to launch nuclear retaliation against a Soviet attack. With the U.S.'s major nuclear deployments in the United Kingdom and the close nature of Anglo-American relations, Macmillan sought U.S. agreement o consultations before making the most fundamental military decision of th all. British leaders had been pressing Washington for agreements on consultation since the November 1950 Korean War crisis but U.S. leaders anxious to preserve freedom of action, would agree to only the most gene commitments.[10]

In this commentary on the problem of consultation, State Department official Robert Fearey broke down the issue into "four possible cases": Tl first scenario might be called "launch under attack": when nuclear bombs and missiles are raining on British and U.S. territory, consultations woulc not be necessary or possible because of the urgent necessity to launch a retaliatory strike. "Launch on warning" characterizes the second scenaric with electronic sensors detecting a Soviet bomber-missile attack, "there might be time" for consultations on whether the warning information wa accurate and whether missiles or bombers should be launched in retaliatic Only if the Soviets launched a non-nuclear attack or Western intelligence had advance warning of a Soviet nuclear strike would there be time for consultations on nuclear weapons use. Although the Eisenhower administration accepted the importance of consultations between presidei and prime minister, in the June 1958 Murphy-Dean agreement, it reaffirm early agreements that decisions to launch bombers or missiles had to be made "in the light of the circumstances at the time."

Document 2

Report by Jerome Wiesner, President's Science Advisory Committee, "Warning and Defer in the Missile Age," 3 June 1959, memorandum from Goodpaster attached dated 11 June 1959, Top Secret.

Source: Dwight D. Eisenhower Library, Anne Whitman File, Dwight D. Eisenhower Diari box 42, Staff Notes June 1-15 1959 (2) (also available in National Security Archive published microfiche collection, U.S. Nuclear History: Nuclear Weapons and Politics in tl Missile Era, 1955-68, Washington, D.C., 1998)

The possibility and desirability of a launch on warning capability for the United States was a premise of a briefing given on 3 June 59 to President Eisenhower by MIT professor Jerome Wiesner, then a member of the President's Science Advisory Committee (PSAC) (He became White Hou science adviser for President Kennedy in 1961). While doubtful of the value of anti-ballistic missile systems, Wiesner saw advantage in an infra-red warning capability that would permit missile launch after receip of a warning but his presentation did not approve MIDAS. Skeptical that MIDAS could overcome technical obstacles, the science advisers were fa

more interested in using high-altitude U-2 aircraft as a platform for an infra-red detection system.[11]

Document 3

Memorandum, Gerard C. Smith, Director, U.S. Department of State Policy Planning Staff Foy Kohler, Assistant Secretary of State for European Affairs, 22 June 1960, with enclosu Top Secret

Source: National Archives, Record Group 59, Department of State Records, Policy Planni Staff Records, 1957-61, box 20, file: Owen, H. Chron (also available in National Security Archive published microfiche collection, U.S. Nuclear History: Nuclear Weapons and Politics in the Missile Era, 1955-68, Washington, D.C., 1998)

While Wiesner endorsed a launch-on-warning capability, other civilians I their doubts. The reference to launch-on-warning in this document appea in the context of the late 1950s-early 60s debate over the creation of a medium-range missile force for NATO that would enable non-nuclear powers like West Germany to participate in decisions on nuclear weapon: use. In this memorandum, Policy Planning Staff director Gerard C. Smit cites part of a briefing by Supreme Allied Commander Europe (SACEUR General Lauris Norstad where the latter argued that the NATO missile for had to be "ready to react two to five minutes after warning." Smith interpreted that statement as support for "fir[ing] after warning of impend attack and before Soviet missiles had landed." What troubled him was th it was inconsistent with Norstad's emphasis on the importance of a survivable missile force. Perhaps worried about the possibility of inaccu warning, Smith questioned the need for "instant reaction." This would n be the last time that he would raise questions about the propriety of a launch-on-warning posture.

Document 4

U.S. National Security Council Planning Board, "U.S. Policy on Continental Defense," 14 July 1960

Source: National Archives, Record Group 59, Department of State Records, Records of Department of State Participation in the Operations Coordinating Board and the National Security Council, 1947-196, Box 94, "NSC 5802 Memoranda" (also available in National Security Archive published microfiche collection, U.S. Nuclear History: Nuclear Weapon: and Politics in the Missile Era, 1955-68 Washington, D.C., 1998)

Reservations about launch-on-warning appear in this analysis of the problem of defense against bomber and missile attack. Prepared for a meeting of the National Security Council by the NSC's Planning Board, t drafters are not identified, but it is likely that Gerard C. Smith made a contribution because as director of the State Department's Policy Plannin Council, he served on the Board. Written during the period of the "missil gap" controversy, when actual Soviet intercontinental ballistic missiles (ICBM) capabilities were in doubt and worst-case analyses were routine, this study predicted that Soviet missiles would "constitute a great threat"

U.S. cities by the end of 1960. This was an overstatement but the possibility of missile attack and the few minutes of warning of attack that would be available to decisionmakers raised questions that NSC planners believed had to be taken seriously; for example, should U.S. policy should emphasize "passive defense" measures and did air defenses needed to be reoriented? Question 3 (page 11) was especially apposite to the launch of warning problem: "should the United States revise ... its doctrine on response to attack and on response to warning of attack, in the light of decreased reaction time and in view of the increasing U.S. emphasis on retaliatory ballistic missile forces?"

The analysts were confident that the DEW (Distant Early Warning) line would provide sufficient warning of a bomber attack. That would give White House and Defense authorities "adequate time" for making decision and also enable them to put Strategic Air Command bombers in the air, n only to prevent destruction on the ground but also to launch on attack. A new warning system--the Ballistic Missile Early Warning System [BMEWs]--was in the works that would at best give U.S. authorities fifte minutes to respond to an incoming ICBM attack (although the proposed MIDAS system would be able to provide more time), hardly enough time for decisionmakers to assess the situation, make a decision, and transmit to commanders. Until BMEWs was available, only the Bomb Alarm System, then being deployed, could give definitive information on nucle. detonations.

As the authors note, an important advantage of strategic bombers was that, unlike ICBMs, they could be recalled. For the Planning Board, an unrecallable ICBM nuclear force made launch-on-warning of doubtful value: it was "questionable whether U.S. response doctrine will permit th launch of `irrecallable' ballistic missiles solely on the basis of information received from a warning system." The analysts doubted that BMEWs an any follow-on systems could provide "high confidence high early warning and judged it "essential" to avoid launching unrecallable missiles based o false warning (see paragraph 43). Instead, the Planning Board stressed t importance of a "reliable bomb alarm system to provide early positive information of actual missile hits." Tacitly, these analysts supported wha has come to be known as a launch-under-attack posture: a nuclear strike permissible only if warning information confirmed nuclear detonations.

Document 5

Letter from Secretary of Defense Robert S. McNamara to Senator John Stennis, Chairman Preparedness Investing Subcommittee, Senate Armed Services Committee, enclosing stud commenting on "requirements" for warning and detection systems, 3 November 1961

Source: National Archives, Record Group 200, Papers of Robert S. McNamara, box 113, Reading File Nov. 1961 (also available in National Security Archive published microfiche collection, U.S. Nuclear History: Nuclear Weapons and Politics in the Missile Era, 1955-(Washington, D.C., 1998)

Interested in the status of U.S. warning and detection capabilities, Senato
Stennis (D-Ms) sent McNamara a list of eight "requirements" to which
McNamara responded with detailed information describing deployed and
proposed systems. In the course of this assessment of various deployed a
proposed systems--DEW Line, BMEWS, MIDAS, etc.--McNamara
responded on page 17 to Stennis's request for information on whether a
fifteen-minute warning time "would be sufficient for the warning to be
transmitted, the command to be given and communicated, and our weapo
actually launched before enemy missiles or bombs impact in our territory
(see page 17). McNamara confidently observed that fifteen minutes woul
be enough to assess warning intelligence, convene an emergency confere
of the president and other National Command Authorities, and transmit a
execution order to commanders, as well as launch "all SAC alert aircraft
and Atlas E ICBMs and one third of the Atlas D ICBMs." McNamara wa
describing what amounted to a launch-on-warning capability, but one mu
wonder whether what he was asserting was operationally feasible, for
example, whether missiles could actually be launched in a few minutes.
Unless they were fueled and in an alert posture, the cumbersome Atlas
ICBMs could not be quickly launched. With the advent of quick-reactior
Minuteman missiles (see document 7), however, the rapid response that
McNamara envisioned was somewhat more plausible, as long as the
command-and-control system functioned more or less flawlessly.[12]

Document 6

Letter from General Bernard Schriever, Commander, U.S. Air Force Systems Command,
Secretary of the Air Force Eugene M. Zuckert, Subject: DOD Program Change (4.4.040) (
MIDAS (239A)

Source: Library of Congress, Papers of General Curtis LeMay, Box 141, AFSC (AF Syste
Command) 1962

McNamara may have been ambivalent, about a launch-on-warning postu
according to one account, at some point during the Kennedy administrati
he stated that he strongly opposed launch-on-warning. During a meeting
with McNamara, General Bernard Schriever, then commander of Air For
Systems Command, justified MIDAS by claiming that it would give the
United States a launch-on-warning capability. A witness to the meeting
later recalled that McNamara was "furious" and told Schriever that "as lo
as he was secretary of Defense and Jack Kennedy was President, the Uni
States would never launch on warning, even if that required a force of
10,000 Minuteman ICBMs."[13]

To Schriever's dismay, in early August 1962, McNamara ruled against
Air Force plans to deploy MIDAS satellites; from McNamara's perspecti
MIDAS was too costly, it duplicated other warning systems, and the
hardening of missile silos reduced the importance of early warning.[14] As
this document shows, Schriever was firmly convinced that warning

information from MIDAS was essential; he lobbied the Secretary of the /
Force to urge McNamara to reconsider. Despite Schriever's efforts,
however, it would be some years before MIDAS became operational.

Document 7

Letter from Secretary of the Air Force Eugene M. Zuckert to President Kennedy, 26 Octot
1962

Source: Library of Congress, Papers of Curtis M. LeMay, box 153, 19-3 White House 196
(also available in National Security Archive published microfiche collection, U.S. Nuclear
History: Nuclear Weapons and Politics in the Missile Era, 1955-68, Washington, D.C.,
1998)

A capability for nearly instant launch of strategic missiles, an important
technical condition for launch-on-warning, came into play during the fall
1962. At the height of the Cuban Missile Crisis, the Strategic Air
Command began to deploy nuclear-armed Minuteman I missiles in silos
located near Malmstrom Air Force Base in Montana. Secretary of the A
Force Zuckert reported to President Kennedy that the deployment was
occurring under "unusual safety conditions" so that it would take hours tc
launch the missiles. Zuckert's confidence in safety procedures on the
ground was misplaced; the missiles could actually be launched immediate
foreshadowing their normal alert status.[15] He also informed Kennedy th
once the Minutemen in the first complex had been deployed in their "norı
alert status," all "twenty missiles will be able to be launched in thirty
seconds."

Document 8

Secretary of the Air Force Eugene M. Zuckert to Secretary of Defense Robert S. McNama
"Air Force Proposed Changes to the Tentative Force Guidance," 29 August 1964, Top Sec
[excerpts]

Source: National Archives, Record Group 200, Robert S. McNamara Papers, box 42,
Defense Projects and Operations (also available in National Security Archive published
microfiche collection, U.S. Nuclear History: Nuclear Weapons and Politics in the Missile
Era, 1955-68, Washington, D.C., 1998)

This memorandum elucidates the counterforce, or "damage limiting",
assignment of the Minuteman ICBM force. Its chief targets were the 600
"time-urgent" Soviet bomber bases and missile sites, among others, that I
to be destroyed before they could endanger U.S. allies or U.S. territory. 1
problem of "known failure"--that some percentage of ICBMs would fail
reach their target--made it necessary to assign an average of 1.67 missiles
assure that one "on-launch reliable" Minuteman hit its target. Concepts of
preemptive use and/or launch-on-warning necessarily underlay the Air
Force's strategic thinking because the Minuteman would have to strike th
"time urgent" targets before the Soviets launched the bombers or missiles
With U.S. reconnaissance satellites expected to locate more "time-urgent
targets," Secretary of the Air Force Zuckert sought Robert McNamara's

approval for a total force of 1200 Minutemen missiles to strike them. McNamara, however, had firmly decided that 1000 Minutemen was "enough"; moreover, a new technology then still on the drawing-boards-- multiple-independently targetable re-entry vehicles (MIRVs)--would mak it possible to strike more targets with the same number of ICBMs.[16]

Document 9

Lawrence Lynn, U.S. National Security Council Staff, to Henry Kissinger, Assistant to the President for National Security Affairs, "Talking Paper on 'Firing on Warning' Issue," 1 M 1969

Source: National Archives, Nixon Presidential Materials Project, National Security Counc Files (hereinafter Nixon NSF), box 840, Sentinel ABM System Vol. II, 4/1/69

The paper trail on thinking about launch-on-warning during the reminde of the 1960s is meager. Lawrence Lynn, the NSC's defense program analyst, prepared this document for Henry Kissinger's use in discussion v "prominent news columnists." Apparently, leading opponents of Anti-Ballistic Missiles (ABMs), including Sen. Albert Gore Sr. (D-TN) h suggested a "launch-on-warning" option as an alternative method for preserving the ICBM force from attack. The White House, however, wanted to shoot down "firing on warning" as "dangerous and irresponsibl because early warning sensors had such a high rate of false reports. Thus the "possibility of a disastrous mistakes" would be a "very real one." Drawing on classified information, Lynn reported that existing warning systems, BMEWs and Over-the-Horizon Radar (OTH)[17], had significant false reports rate; for example, 50 percent of initial OTH reports were fal Lynn showed, however, why some would find launch-on-warning to be workable: the "new early warning satellite [647 project] may produce on false alarm per year."

Document 10

Helmut Sonnenfeldt, NSC Staff, to Henry Kissinger, "`Message' to You From Arbatov," 2: September 1969, Secret, Nodis[18]
Source: Nixon NSF, box 710, USSR Vol V. 10/69

References to launch-on-warning emerged during a conversation at an Institute for Strategic Studies meeting, between Georgy Arbatov, a Sovie American specialist who headed the Institute of USA and Canada Studies and Helmut Sonnenfeldt, a European and Soviet affairs specialist, who h joined Kissinger's NSC Staff after years of service in the State Departmer Bureau of Intelligence and Research. Reflecting the difficulties in American-Soviet relations during the summer and fall of 1969, the conversation turned to the strategic nuclear issues, including U.S. uncertainties about the SS-9, a huge Soviet ICBM that appeared to threat U.S. Minuteman silos. To Sonnenfeldt's apparent surprise, Arbatov

observed that there was little to "worry" over because "neither side woulc wait if it received warning of an attack but instead ... would simply empt' out its silos by launching a counter-strike at once." Sonnenfeldt objected noting the danger to "strategic stability" of a launch-on-warning posture. He also doubted that Arbatov's statement reflected "existing doctrine." T was not entirely true; while Soviet command authorities lacked advanced warning systems, the Soviet military nevertheless aspired to a launch-on-warning posture.[19]

Document 11

U.S. Arms Control and Disarmament Agency (ACDA), Public Affairs Bureau, "The 'Laur on Warning' Question in the First Phase of SALT," 21 December 1973, Secret, Noforn[20]
Source: ACDA FOIA release to National Security Archive

Some months after the Arbatov-Sonnenfeldt discussion, during the sprin[1970, the problem of launch-on-warning received more attention during t Strategic Arms Limitations Talks (SALT), later summarized in this ACD. report. During an April 1970 discussion of a possible ban on multiple reentry vehicles, chief Soviet negotiator Vladimir Semenov raised the problem of launch-on-warning when he noted that new warning systems would enable governments to launch missiles and to empty silos before " enemy [strikes] a blow at them." A few weeks later, Gerard Smith, the he of the U.S. SALT delegation, showed his concern about launch-on-warnin when he asked whether governments should plan to fire missiles "solely (the possibly fallible reading of signals from ... early-warning systems." Such a posture would be "very dangerous and would increase the risks of unwanted war." The discussion did not go much further, although it beca evident that General Ogarkov, the top military official on the Soviet SAL' delegation, was resentful that Smith had taken the discussion further and told U.S. General Royal Allison that "as a military man, [he] should knov the answer" to Smith's question: presumably, that governments needed to rely on warning systems.

Smith wanted to influence the influence the debate further. While acknowledging that Soviet uncertainty as to whether the United States ha launch-on-warning posture could have "some deterrent value" and even some provide some "bargaining leverage" in the SALT talks, on balance Smith believed there would be more "risk and danger" if the Soviets had "mistaken view" of U.S. policy. Thus, on 19 May, Smith cited a slightly equivocal statement of "hope" by Secretary of Defense Melvin Laird that "that kind of strategy would never be adopted by any Administration or t any Congress."

Document 12

Memorandum from Seymour Weiss, State Department Policy Planning Council, to Undersecretary of State John Irwin and Deputy Secretary of State for Political Affairs U. ı Johnson, "Luncheon Conversation October 2 with Paul Nitze on SALT," 7 October 1970, Top Secret/Nodis/Sensitive

Source: RG 59, Policy Planning Council Miscellaneous Records, 1959-72, box 299, SALT 1970 October 1-13

The apparent growing vulnerability to a surprise attack of U.S. land-base ICBMs worried the hawkish Paul H. Nitze, the author of NSC-68 and a former Deputy Secretary of Defense and Secretary of the Navy and a member of the U.S. SALT delegation. During a conversation with a like-minded State Department official Seymour Weiss, Nitze worried that even with a SALT agreement, Moscow might be in a position to install multiple independently targetable reentry vehicles (MIRVs) on the SS-9 ICBMs, thus giving Moscow a "first strike capability against US land-ba: missiles." Nitze saw several alternatives to address this vulnerability: 1) developing a first strike capability, 2) a launch on warning doctrine, or 3) abandoning land-based missiles and "move entirely to sea" by relying on submarine-launched ballistic missiles.

Nitze argued that launch on warning was "always contrary to US strategic policy" and would be "inexcusably dangerous" during a "time o intense crisis." Nevertheless, he acknowledged that Washington could "t forced" into a launch-on-warning posture if Minuteman vulnerability "seems at least theoretically possible."

Document 13

Meeting of the General Advisory Committee on Arms Control and Disarmament [GAC], Thursday, January 21, 1971, "ICBM Survivability," Top Secret, excised copy, excerpt

Source: Donation from ACDA

While Paul Nitze and Gerard Smith were alert to the risks, a launch-on-warning posture was already embedded in U.S. nuclear planning. Bru Blair, who was a Minuteman launch officer in the early 1970s, recalls tha he "was postured for LOW [launch-on-warning] during the early 1970s, ; the whole force and command system were geared to this timing", that is rapid response.[21] This excerpt from a meeting of the General Advisory Commitee on Arms Control and Disarmament [GAC], a group of promin civilian experts on arms control and nuclear forces, shows that military officials showed no doubts about the value of launch-on-warning. Focus on the possible vulnerability of the U.S. Minuteman force to an attack by Soviet ICBMs, GAC heard testimony on, and discussed, Soviet ICBM forces, plans for hardening missile silos, and the possible role of anti-ballistic missile defenses. Toward the end of the session, one of the Committee members, Kermit Gordon, then president of the Brookings Institution, asked whether there was a "plausible scenario" for a simultaneous Soviet first strike against U.S. Minuteman and bomber forc

The discussion that Gordon's query prompted was less than straightforward but a discussion of launch-on-warning flowed from the discussion of different scenario in which Soviet ICBMs and submarine-launched ballistic missiles (SLBMs) were launched to strike U.S. Minuteman silos and bomber bases respectively. Because the SLBMs would have shorter trajectories than the ICBMs, two possibilities were available: 1) the SLBMs and ICBMs are launched simultaneously, which would mean that the SLBMs would hit their targets first, or 2) the timing the launches is arranged so that the SLBMs and ICBMs hit their targets simultaneously, thus, the ICBMs would be launched first. As Caltech President (and former Secretary of the Air Force) Harold Brown observe if the Soviets launched their ICBMs, they would risk a [U.S.] "launch on warning." Commander James Martin then observed that "there's about 2(minutes in their when the President might decide to launch on warning." The matter of fact way that Martin broached the possibility of launch-on-warning suggests that U.S. nuclear planning already included such an option.

The "hundreds of nuclear weapons" on the tips of SLBMs would strik U.S. bomber bases around the country and inevitably kill many civilians. Even if the attack was not designed as a "counter-population," but as a counterforce, strategy, as Brown observed, "I'm not sure the distinction would be an obvious one" to a nation that "experienced something like that."

Document 14

Memorandum from Leonard Weiss, Deputy Director for Functional Research, Bureau of Intelligence and Research, to Leon Sloss, Bureau of Politico-Military Affairs, Office of International Security Policy and Planning, "Your Memorandum on `Launch-on-Warning, 29 January 1971, enclosing memorandum from Frank H. Perez, Office of Strategic and General Research, to Leonard Weiss, "Thoughts on Launch-on-Warning," 29 January 197 Secret

Source: RG 59, Subject-Numeric Files, 1970-1973, Def 12 USSR

Prepared only a few days after the GAC discussion, this significant document shows that State Department intelligence officials recognized t a capability for launch-on-warning existed and that they gave it relatively uncritical support, although one of the authors of this document, Frank Perez, carefully observed that he was "not advocating [its] adoption."

Neither Perez nor his superior officer, Leonard Weiss (Seymour Weiss less hawkish cousin) were interested in a launch-on-warning capability because they thought it should or would be used. They constructed their argument around the logic of deterrence: that the Soviets would detect a U.S. capability to get the Minutemen "off the ground in time." Even if th Soviets struck first, launch-on-warning would enable the United States to inflict "intolerable damage" on the Soviet Union. Recognition of that capability would deter Moscow from "the possibility of undertaking a fir:

strike."

Whether the Soviets would get the message remained an imponderable but the anticipated launch-on-warning capability would depend on the availability of "unambiguous warning" which would be provided by sophisticated warning systems and missile tracking capability, which wer becoming available. The 440-L Over-the-Horizon system and the 647 ea warning satellite, also known as the Defense Support Program, could det mass missile launches.[22] Perimeter Acquisition Radars (PAR), a type of phased array radar, could provide "absolute certainty as to the size of the attack and ... where [it] originated and to where it was directed," for example, whether Minuteman fields were a target.

With new warning systems in place, Perez believed that a President would have a choice other than "rid[ing] out the attack and then respond[ing] with what residual [forces] remained." Instead, the presider could "respond to a Soviet attack based on his assessment of the situation Indeed, if deterrence failed and the Soviets launched an attack, Perez recommended against an all-out response by Minuteman forces because t would invite a Soviet attack on U.S. population and industrial centers. Instead, he suggested a controlled response of some 200-300 Minutemen against high-value Soviet military targets away from urban-industrial centers, supposedly limiting civilian casualties. That suggestion would dovetail with later thinking about how to use a launch-on-warning capability.

Document 15

Memorandum to the Secretary [William P. Rogers] Through S/S [Executive Secretary] Fr the Undersecretary [John Irwin], "DPRC Meeting of [sic] Survivability, March 17 - Information Memorandum," prepared by Leon Sloss, Office of Politico-Military Affairs, 1 March 1971, Secret.

Source: RG 59, Records of Undersecretary of State John Irwin, 1969-73, box 5, SALT Jan-June 1971

One of the problems that generated interest in a launch-on-warning capability was the alleged vulnerability of the U.S. Minuteman force to Soviet attack. This summary of a meeting of the National Security Council's Defense Program Review Committee [DPRC], chaired by national security adviser Henry Kissinger, suggests interagency agreemer that the Soviets had the wherewithal to make Minuteman vulnerable but differences over when the threat would materialize. Taking the most cautious, "worst case" approach, the Defense Department estimated a thre by the mid-1970s. The "intelligence community", presumably the CIA, however, did not see a vulnerability problem at least until later in the dec depending on when the Soviets could deploy accurate MIRVs on the SS-9

As some argued at the time, a "vulnerable" Minuteman force might nc be a serious liability when more survivable SLBMs could threaten Soviet

cities. Nevertheless, for some on the DPRC, the vulnerability problem posed important political questions, for example, "how would US politic; leadership react in a crisis if a significant portion of US force was considered vulnerable"? One possible implication was that if national authorities saw a danger of a Soviet preemptive move against U.S. missil silos, they might raise alert levels for possible recourse to launching Minutemen on warning. Raising alert levels, of course, could increase anxiety levels at the Kremlin heightening the risks of nuclear war. Only future declassification releases, however, may elucidate the DPRC's later discussions of the broader implications of the survivability problem.

Document 16

K. Wayne Smith, National Security Council Staff, to Henry Kissinger, "Harold Brown on SALT," 10 May 1971, Top Secret, enclosing letter from Brown to Kissinger, 3 May 1971, Secret.
Source: Nixon NSF, box 808, Brown, Harold

Former Secretary of the Air Force (and future Secretary of Defense) Har(Brown was another Johnson administration official recruited by the Nixo administration for the SALT delegation. A active participant in the negotiations, Brown pushed for tight limits on anti-ballistic missiles, evei the possibility of an outright ban ("zero ABM"), because he believed that ABMs provided dangerous momentum to the strategic arms competition and also constrained U.S. war plans. As he argued in his letter to Kissing Brown argued that limiting ABMs, especially ABM radars, was even mo important than limiting large Soviet ICBMs like the SS-9. If the Soviets deployed MIRVs on the SS-9 they could pose a threat to U.S. Minutemar silos but, Brown believed, a launch on "unambiguous" warning capabilit) not a doctrine, would make an attack on Minuteman "a relatively risky ar unattractive" proposition. Attentive to the danger of false warning, Brow conceded that launch-on-warning was not a "sure tactic." Apparently unaware that a launch-on-warning was already integral to the U.S. nucle; posture, Brown observed that a capability could be "relatively easily ... achieved during the mid-70s." Like Perez, Brown believed that Minuterr missiles launched on warning could hit military targets, although he specifically had Soviet bomber bases in mind. Brown would keep these ideas in mind because by the end of the 1970s, as Secretary of Defense h(preceded over decisions to include a specialized launch-on-warning optic in the SIOP.

K. Wayne Smith, the NSC's director for program analysis during the early 1970s prepared comments on Brown's letter for his boss. Smith fot value in Brown's argument on the importance of controls over ABM rada but he raised questions about the merits of launch-on-warning. He was n wholly persuaded by Brown's argument about launch-on-warning as a deterrent because of the danger that during an international crisis such a capability could be destabilizing by encouraging one side or the other to ;

precipitously.

Document 17

L. Wainstein et al., "The Evolution of U.S. Strategic Command and Control and Warning, 1945-1972, Study S-467, Institute for Defense Analyses, June 1975, Top Secret, excerpts.

FOIA request to Department of Defense (also available in National Security Archive published microfiche collection, U.S. Nuclear History: Nuclear Weapons and Politics in th Missile Era, 1955-68, Washington, D.C., 1998)

A launch-on-warning capability depended on warning information, quick reaction nuclear forces, but also a command-and-control apparatus that could assess strategic intelligence, make appropriate decisions, and rapid convey them to military commanders.   Pages 345-347 from chapter XX of this Institute for Defense Analyses history describe the Defense Suppo Program (DSP) satellites and their role in providing "usable warning time as well as qualitatively better information so National Command Authori would be better able to assess an attack.   In that way, the authors of this study argued, National Command Authorities (NCA) would be in a bette position to chose the appropriate SIOP option, for example, whether to "execute strikes against nuclear threat targets only" or against "nuclear threat plus other military targets or against nuclear threat plus other milit plus urban-industrial targets of a country."   Other options were to execute withhold strikes against specific Soviet allies or against Moscow or Beiji or against China's nuclear delivery and storage sites.

Chapter XXX of this study describes the central features of the Nation Military Command System as it stood during the early 1970s   If the Defense Support satellites detected a missile attack, the North American Defense Command would assess intelligence information and transmit it the National Military Command Center (NMCC) at the Pentagon. In turn the NMCC would transmit the assessment to the two principal civilian policymakers in the military sphere, the National Command Authority (NCA): the President (Commander-in-Chief) and the Secretary of Defens

Acting under the NCA's instructions, the Chairman of the Joint Chiefs Staff could implement and transmit orders for the execution of the SIOP through (NMCC) to top military commanders using special ground-based and airborne communications systems. For example, the Commander of Strategic Air Command (CINCSAC) had at his disposal pre-attack and post-attack systems (see pages 386-388) that could be used to communic; orders to SAC forces. One such system, the Emergency Rocket Communications Systems (ERCS), used six non-armed Minuteman missi that, during their flight, could broadcast CINSAC's messages to SAC lau control centers, bomber forces, and ground elements.

As important as a command-and control system was, confidence in its reliability was not high and, as the authors observed in chapter XXXII, reports on its failings were "continuous" during this period (and beyond).

Thus, whether the NCA could properly assess warning information, mucl less make a decision to launch-on-warning and successfully transmit it to commanders in the field, would be problematic. For example, in 1970, e though the Defense System Program had already been successfully testec the Blue Ribbon Defense Panel reported on the difficulty of providing warning information to the president: "it is possible that no President cou be sure ... that an attack was in progress or that retaliation was justified," unless confirmation of nuclear detonations was already available (p. 408) In addition, communication systems were vulnerable to the electromagne pulse created by nuclear detonations in the air. A senior Pentagon officiz the late David Packard, who had an abiding interest in command and control problems, left the Pentagon in 1972 in a pessimistic frame of min he acknowledged that "the U.S. might not be able to respond at all to a surprise attack ... because of weaknesses in control over the nation's strategic nuclear forces" (p. 417).

Document 18

Minutes, National Security Council Meeting, "SALT (and Angola)", 22 December 1975, 1
Secret, excised copy
Source: Gerald R. Ford Library, National Security Council Meetings Files, Box 2

During a review of Soviet strategic offensive capabilities and the impasse the SALT II negotiations, Secretary of State Henry Kissinger, JCS Chairr George Brown, Secretary of Defense Donald Rumsfeld (in his first incarnation in that role), and their colleagues, engaged in a brief discussic of the possibility and problems of launch-on-warning (see pages 8-9). Discussing a worst-case scenario--a Soviet ICBM attack on U.S. Minuteman silos--Kissinger showed how difficult it would be for Soviet leaders to contemplate such an attack. Not only could the United States respond by launching SLBMs and bombers, it could also launch ICBMs (warning; the Minuteman force alone could produce 80 million Soviet casualties. When ACDA Director Fred Ikle mentioned the risks of a laun(on-warning posture--"accident prone" and "dangerous"-Kissinger impliec was already an available option by suggesting that command-and-control arrangements could be fixed to ensure that missiles were never launched without "presidential authority."[23] But Kissinger and top Pentagon offici were more interested in preserving the ambiguity of the U.S. posture so tl the Soviets could not know with any certainty that, in Kissinger's words, United States had a "launch-on-warning policy." Ambiguity would complicate Soviet nuclear planning; the policymakers wanted to keep Moscow guessing. Further, as National Security Adviser Brent Scowcrol suggested, it was "not to our disadvantage if we appear irrational to the Soviets in this regard." The implication was that such a tack could make Soviets a bit nervous about launch-on-warning and encourage Soviet diplomatic caution.[24]

Document 19

C.H. Builder, D. C. Kephart, A. Laupa, "The U.S. ICBM Force: Current Issues and Future Options," RAND Corporation, PR-1754-R, October 1975, Secret, excised copy

Source: FOIA release by U.S. Air Force

This heavily excised report, which is still under appeal at various agencie shows how Carl H. Builder and his RAND colleagues looked at launch-on-warning when they considered future roles for ICBMs. These analyst were strongly interested in identifying and analyzing the possibility of unique roles for the Minuteman force, e.g., limited strategic operations o1 counterforce missions. But they also recognized that some analysts believed that ICBMs were only one element of a mix of strategic forces ("the triad") whose value as a deterrent depended on their survivability during a preemptive attack. The authors believed that worries about a preemptive counterforce attack were exaggerated, but they saw no good choices for assuring survivability.

Builder and his colleagues saw "launch-under-attack-assessment" as o method for preserving the Minuteman force from attack. Highlighting "attack assessment" instead of "warning," their term presaged one that would come into vogue within a few years, "launch under attack." Furth(their definition of attack assessment showed that the authors sought more authoritative reliance than satellite warning systems: to avoid a precipito missile launch, they suggested that a "launch decision" would depend in part on "confirmed reports" that Soviet warheads had detonated "in the U heartland.

To support launch-under-attack assessment, the authors drew on a logi similar to that employed by INR's Frank Perez: "we believe that the technical capabilities to launch ICBMs on attack assessment should be developed for their deterrence value--so that no adversary would dare assume that the U.S. could not launch the force out from any attempted disarming attack." Nevertheless, the authors argued against an open declaration of policy because the idea of launch-on-warning was so controversial: "it would be rigorously opposed as both dangerous and unstable (an accident could theoretically precipitate a nuclear war)." The authors also argued that the matter of ICBM survivability alone should n(determine a decision to launch on attack assessment. Implicitly, the dang of nuclear war was too terrible to allow the "assurance of ICBM retaliato capabilities [to] rest upon such an awesome commitment."

Document 20

U.S. Strategic Air Command, "Current US Strategic Targeting Doctrine," prepared by Colonels Kearl and Locke, 3 December 1979, Top Secret.

Source: excised copy released on appeal by Air Combat Command

Important not only for what it discloses about launch on warning, this is ⟨
of the few declassified documents that describes, even if only in outline a
highly sanitized form, some of the key developments in U.S. nuclear
targeting policy during the 1970s. For example, it includes a summary ⟨
conclusions reached in the Carter administration's "Nuclear Targeting Pol
Review" (NTPR), which remains classified. Consistent with earlier offic
thinking on U.S. nuclear planning, strategists of the 1970s were pessimis
about U.S. capability to limit damage to the United States through a
counterforce strike against Soviet strategic nuclear forces. For the
strategists it had become essential to find ways to limit damage by
controlling escalation, so that a small-scale superpower confrontation, ev
a nuclear one, did not turn into all-out war. In that context, nuclear plann
may have seen a specialized launch-on-warning option as part of an effor
control escalation.

According to this summary, the NPTR included a recommendation fo
Launch Under Attack (LUA) option to be exercised by U.S. Minuteman
ICBM forces. LUA is often used interchangeably with launch-on-warnin
but the timing is not quite the same: a "distinction commonly drawn ... w
that LUA withheld launch authority until nuclear detonations had been
detected." In this way, authorities could be sure that there was not a glitc
in the warning system.[25] Whether the authors of the NPTR study suppor
the version that required definite confirmation of one or more detonation:
remains to be seen.

The drafters of the NTPR also suggested target priorities for a LUA:
"low collateral military and leadership subsets." That is, the Minutemen
would be fired at those subsets of military and leadership targets whose
destruction would involve "low collateral" damage, that is, would minim
fatalities among civilian populations. This recommendation roughly
correlated with that of Frank Perez (see document 10), who emphasized
"high value military targets away from population and industrial centers.'
An interest in escalation control prompted this sort of thinking; presumat
by avoiding direct strikes on "high collateral" urban-industrial targets, the
planners hoped to introduce an element of restraint into a nuclear exchan:
although that may have been whistling past the graveyard.

Interest in escalation control may have encouraged Secretary of Defen
Harold Brown to push for the formal incorporation of a specialized launc
on-warning option into the SIOP. Officially confirmed for the first time i
this document, such an option became part of the latest version of the
SIOP--SIOP 5D--on 1 October 1979. In keeping with efforts during the
1970s to breakdown the SIOP into more discrete attack options, war
planners initially conceived of LUA as a Selective Attack Option (SAO)
because they planned to commit Minuteman missiles only to this option.
Soon, however, response under the LUA option was expanded to include
bombers and submarine-launched ballistic missiles, thus turning it into a

Major Attack Option.[26]

How SIOP 5D defined the LUA option or whether instructions for the option followed NPTR recommendations on targets or even required confirmation of nuclear detonations remains to be seen. In any event, as sign that launch-on-warning was becoming routinized in operational planning but that a requirement for definitive information on detonations would not integral to planning, the Joint Chiefs of Staff began to include "launch under attack" in their dictionary of military terms. The Chiefs explained it as "execution by National Command Authorities of Single Integrated Operational Plan Forces subsequent to tactical warning of strategic nuclear attack against the United States and prior to first impact.

Acronyms

AWD - Alert with damage
GWOD - Generated without damage
SRF - Strategic reserve force

Notes

* The editor thanks Bruce Blair, The Center for Defense Information; Raymond Garthoff, Brookings Institution, and Jeffrey T. Richelson, National Security Archive, for comments.

1. "Excerpts from Bush's Remarks on National Security and Arms Policy *The New York Times*, 24 May 2000.

2. For Bruce Blair's writings see, in particular, *The Logic of Accidental Nuclear War* (Washington, D.C., Brookings Institution, 1993), and *Globa Zero Alert for Nuclear Forces* (Washington, D.C., Brookings Institution, 1995). See also Stephen I. Schwartz et al., *Atomic Audit: The Costs and Consequences of U.S. Nuclear Weapons Since 1940* (Washington, D.C., Brookings Institution, 1998), 216-21.

3. For accounts of early U.S. nuclear planning and the first SIOP, see He S. Rowen, "Formulating Strategic Doctrine," U.S. Commission on the Organization of the Government for the Conduct of Foreign Policy, Appendices, Vol. 4 (Washington, D.C., Government Printing Office, 197 217-34; David A. Rosenberg, "The Origins of Overkill: Nuclear Weapon: and American Strategy, 1945-1960," Steven E. Miller, editor, *Strategy an Nuclear Deterrence: An International Security Reader* (Princeton, Prince University Press, 1984), 113-82; and Scott D. Sagan, "SIOP-62: the Nucl War Plan Briefing to President Kennedy," *Interntional Security* 12 (Sumn 1987): 22-51.

4. In the event of a surprise attack, Eisenhower also approved instruction to top commanders predelegating authority to use nuclear weapons in the event that they could not communicate with the President (e.g., if a nucle weapon had destroyed Washington. See National Security Archive Brief Book, "Predelation of Nuclear Use Authority" <www.nsarchive.org....>, as well as an important article by Peter J. Roman, "Ike's Hair Trigger: U.S. Nuclear Predelegation, 1953-60," *Security Studies* 7 (Summer 1998): 121-65.

5. For background on "positive control", see Scott Sagan, *The Limits of Safety: Organizations, Accidents, and Nuclear Weapons* (Princeton, N.J., Princeton University Press, 1993), 163-66.

6. U.S. State Department, FRUS 1961-1963, 8:499-502. See also U.S. State Department, Staff Study, "A Study of US-Soviet Military Relationships, 1957-1976", 18 December 1967 [00179], for further discussion of the declining possibility of conducting "damage limiting" strikes against the Soviet Union.

7. Blair, The Logic of Accidental Nuclear War, 170; Jerome Wiesner, "Warning and Defense in the Missile Age," 3 June 1959 (see document 2 below).

8. For a valuable and comprehensive account of the history of MIDAS a DSP, see Jeffrey Richelson, *America's Space Sentinels: DSP Satellites an National Security* (Lawrence, KS, University of Kansas Press, 1999).

8a. Robert M. Gates, *From the Shadows: The Ultimate Insider's Story of Five Presidents and How they Won the Cold War* (New York: Simon & Schuster, 1996), 114-115. For a 1995 incident involving Russian warnin; systems, see David Hoffman, "Shattered Shield: The Decline of Russia's Nuclear Forces," *The Washington Post*, 15 March 1998.

9. For background on defense authorization legislation, see Morton Min "Two Minutes to Launch," *The American Prospect*, 26 February 2001, 24-28.

10. For background, see the important study by Stephen Twigge and Len Scott, *Planning Armageddon: Britain, the United States, and the Comma of Western Nuclear Forces, 1954-64* (Amsterdam, Harwood Academic Publishers, 2000), 36-37, 117-119.

11. For more details on PSAC's thinking about MIDAS, see Richelson, *America's Space Sentinels*, 12-13, 17.

12. Jacob Neufeld, *Ballistic Missiles in the United States Air Force, 1945-1960* (Washington, D.C., Office of Air Force History, 1990), 213-14

13. Richelson, *America's Space Sentinels*, p. 256, n. 37, citing an intervie

with Jack Ruina. If Schriever ever made an explicit case for launch-on-warning in writing it remains classified or unknown to this researcher.

14. For McNamara's decision, see Richelson, *America's Space Sentinels*, 28.

15. According to Scott Sagan's important study on nuclear safety, "SAC and Air Force contractor personnel appear to have improvised their own safety procedures in a manner that seriously compromises Minuteman nuclear safety." See Sagan, *The Limits of Safety: Organizations, Accident and Nuclear Weapons* (Princeton, Princeton University Press, 1992), 81-9

16. For McNamara's decisions on the Minuteman force, see Schwartz, *Atomic Audit*, 185-86, and Desmond Ball, *Politics and Force Levels: The Strategic Missile Program of the Kennedy Administration* (Berkeley: University of California Press, 1980).

17. Known also as Forward Scatter Radar, Over-the-Horizon (OTH) rada used high-frequency radio transmitters and receivers that were placed on either side of the Soviet Union and China. It would bounce continuous signals between the ionosphere and the earth until the signal reached the correct receiver. The system would detect a missile when it disrupted the stream of signals.

18. That is, no distribution without permission of the State Departent Executive Secretary.

19. Blair, *The Logic of Accidental Nuclear War*, 196-202. For Soviet interest in launch-on-warning, see Steven Zaloga's important study: *The Kremlin's Nuclear Sword: The Rise and Fall of the Russian Strategic Nuclear Forces, 1945-2000* (Washington, D.C., Smithsonian Institution Press, forthcoming, 2002)

20. No distribution to foreign nationals.

21. Blair communication with editor, 22 February 2001.

22. For the deployment of the DSP satellites during the late 1960s and ea 1970s, see Richelson, *America's Space Sentinels*, 44-69.

23. That, however, would not preclude nuclear strikes launched under predelegation arrangements that would be initiated if the president was o of commission.

24. This resonates with a politico-military strategem--the "Madman theory"-- that has been associated with the Nixon administration: the noti that disproportionate threats and unpredictable irrationality could successfully coerce adversaries. See Jeffrey Kimball, *Nixon's Vietnam W* (Lawrence: University of Kansas Press, 1998), 76-86.

25. Blair, *The Logic of Accidental Nuclear War*, 342, note 40.

26. For decisions on LUA, see Blair, *The Logic of Accidental Nuclear Warfare*, 186.

27. Ibid., 168. For the downgrading of information confirming nuclear detonations in U.S. strategic planning during the 1980s, see ibid, 192.